Advanced Open Channel Hydraulics

Course Code	Credit Hours
CE-871	3+0

Course Description

To provide knowledge regarding fundamental principles of conservation of mass, momentum and energy & solution techniques governing geophysical flows over the surface of the earth

Textbook:

1. Richard H. French, Open Channel Hydraulics, McGraw Hill, 1985.
2. VenTe Chow, Open Channel Hydraulics, McGraw Hill, 1959.
3. M. H. Chaudhry, Open Channel Flow, Prentice-Hall, 1993.
4. Francis M. Henderson, Open Channel Flow, MacMillan, 1966.

Reference Book:

1. John A. A. Roberson, John J. Cassidy & M. H. Chaudhry, Hydraulic Engineering (2nd Edition), Wiley Text Books, 1998.
2. J. Townson, Free-Surface Hydraulics, E & FN Spon, 1990.
3. Barbara A. Hauser, Practical Hydraulics Handbook, Lewis Publishers Inc., 1991.
4. Hung Tao Shen, Frontiers in Hydraulic Engineering, ASCE Press, 1983.

Prerequisites. Nil

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10%
Assignments	10%
Mid Terms	30%
End Semester Exam	50%

Teaching Plan

Week No	Topics	Learning Outcomes
1-3	Derivation of equations of conservation of mass, energy and momentum for the free surface flow.	Learn about the governing partial differential equations (PDE) embodying Conservation laws.
4-6	Design of channels for uniform and non-uniform flow; design of vegetated channels.	Design different type of cost-effective channels
7-8	Theory, analysis & solution techniques for the gradually and spatially varied flow	Compute flow profiles and interpret the results.
9	**Mid Semester Exam**	
10-13	Empirical based techniques for solution of rapidly varied flow	Be able to use manuals and charts for design of Hydraulic structures
14-16	Numerical schemes for the solution of 1D and 2D Saint Venant equations.	Understand the role of various parameters (CFL No., Manning coefficient, Mesh density) as well as different algorithms pros & cons
17-18	**End Semester Exam**	